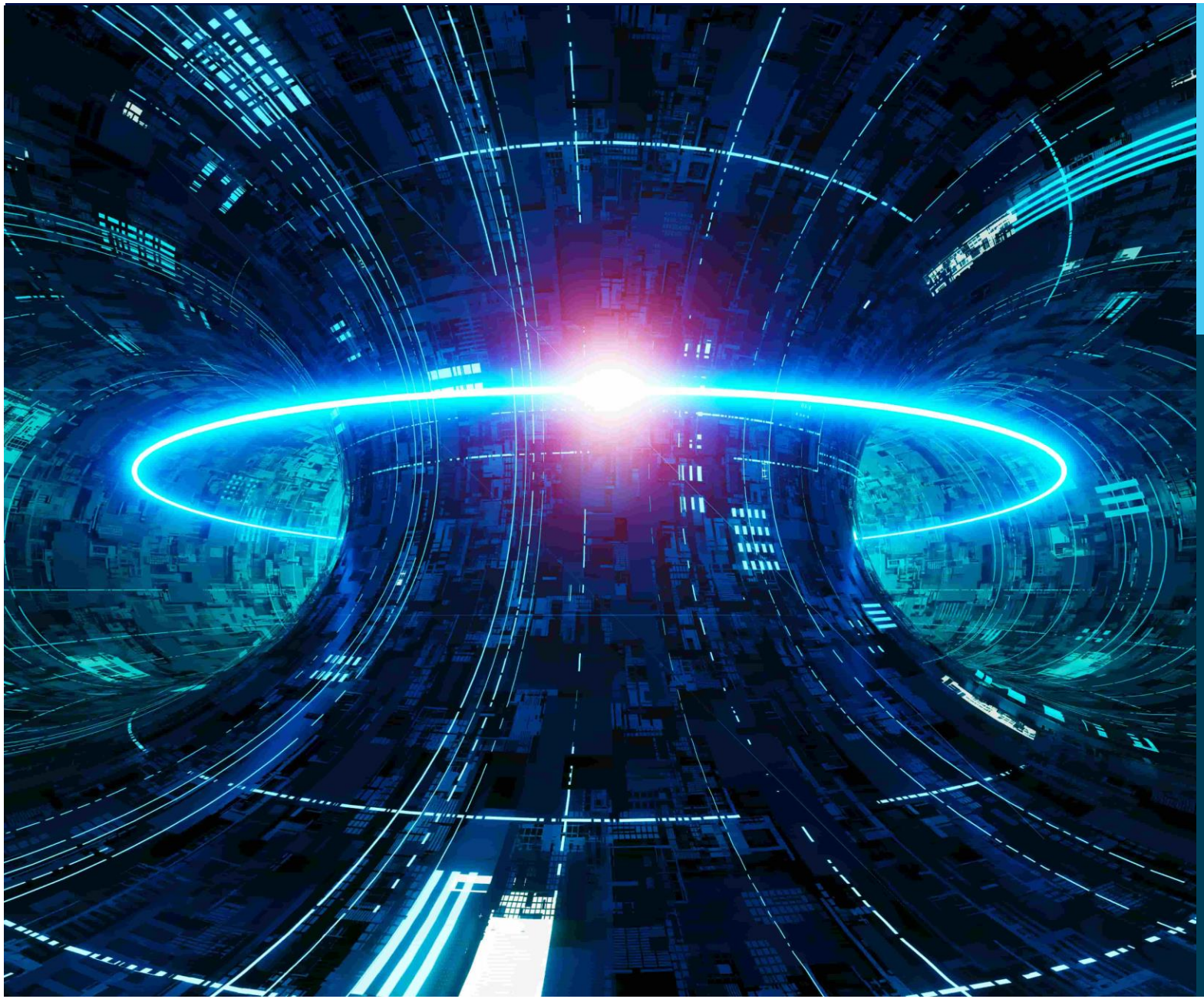


THE UNIVERSITY OF MELBOURNE

Future Energy Forum

23 April 2026

Professor Richard Sandberg

Director, Melbourne Energy Institute

University of Melbourne

THE UNIVERSITY OF MELBOURNE

Welcome

Professor Martin Sevior

Honorary Professor, School of Physics

University of Melbourne

THE UNIVERSITY OF MELBOURNE

Introduction

Dr Warren McKenzie

Founder and Managing Director

HB11 Energy

THE UNIVERSITY OF MELBOURNE

LASER FUSION ENERGY

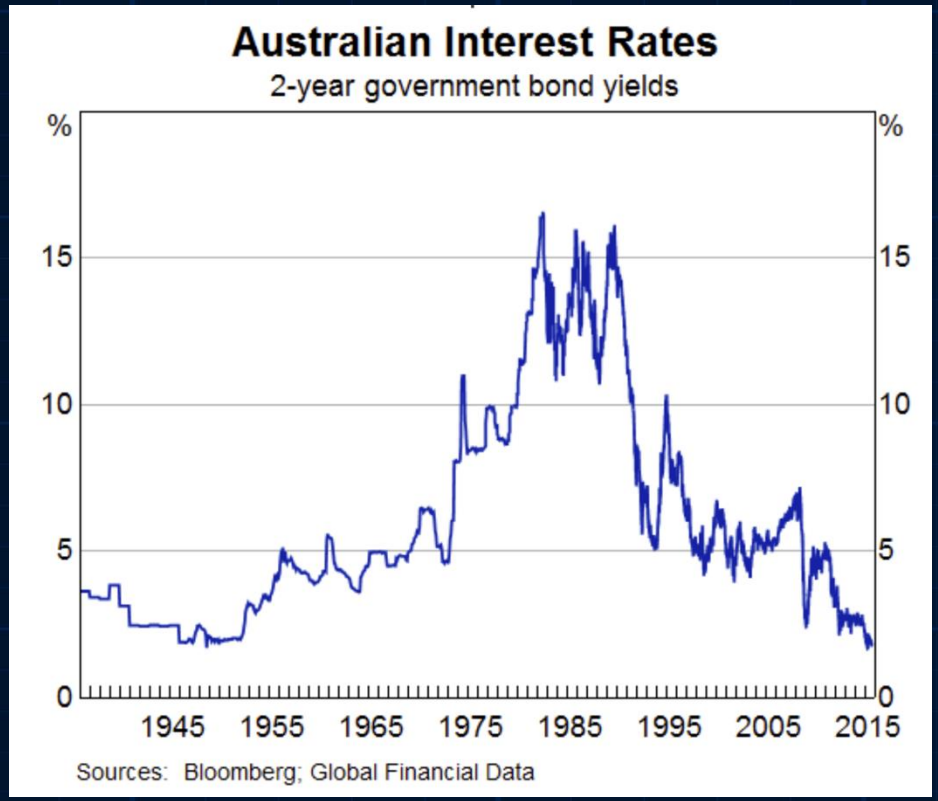
Dr Warren McKenzie, FRSN
Founder, HB11 Energy

Future Energy Forum

ENERGY SECURITY

USA 1970's – Energy supply restricted / OPEC oil embargo

Australia



WHAT IS FUSION?

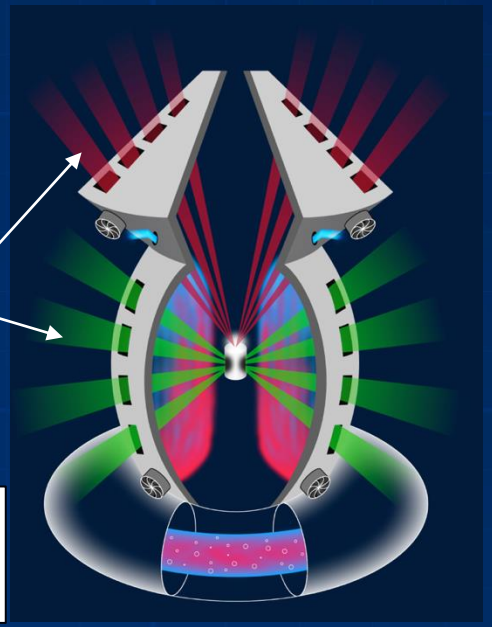
WHAT IS FUSION?

D	+	T	→	He	+ n	+ 17.6 MeV
H	+	B	→	3 He		+ 8.7 MeV

Fusion = pressure x temperature x time

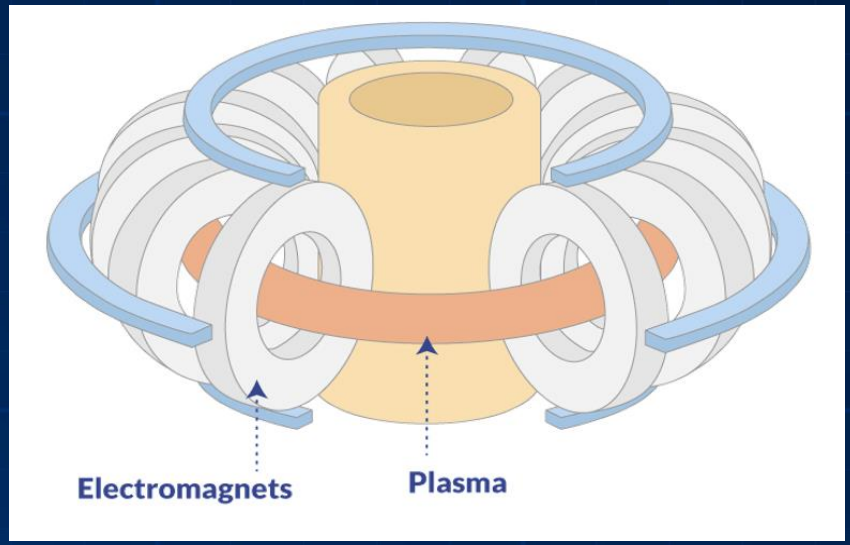
Inertial confinement (Laser) fusion

More **Pressure** | *Less* **Time**



Magnetic Fusion

More **Time** | *Less* **Pressure**



AUSTRALIA'S CONTRIBUTION TO FUSION

Sir Mark Oliphant (Adelaide)

Discovered fusion with Rutherford in 1932

Homopolar Generator, powering the worlds first fusion devices (ANU)

AUSTRALIA'S CONTRIBUTION TO FUSION

Godfathers of Inertial (laser) Fusion

Heinrich Hora, Nikolai Basov, Edward Teller,
John Nuckolls, Chiyoe Yamanaka,
awarding the first Edward Teller medals

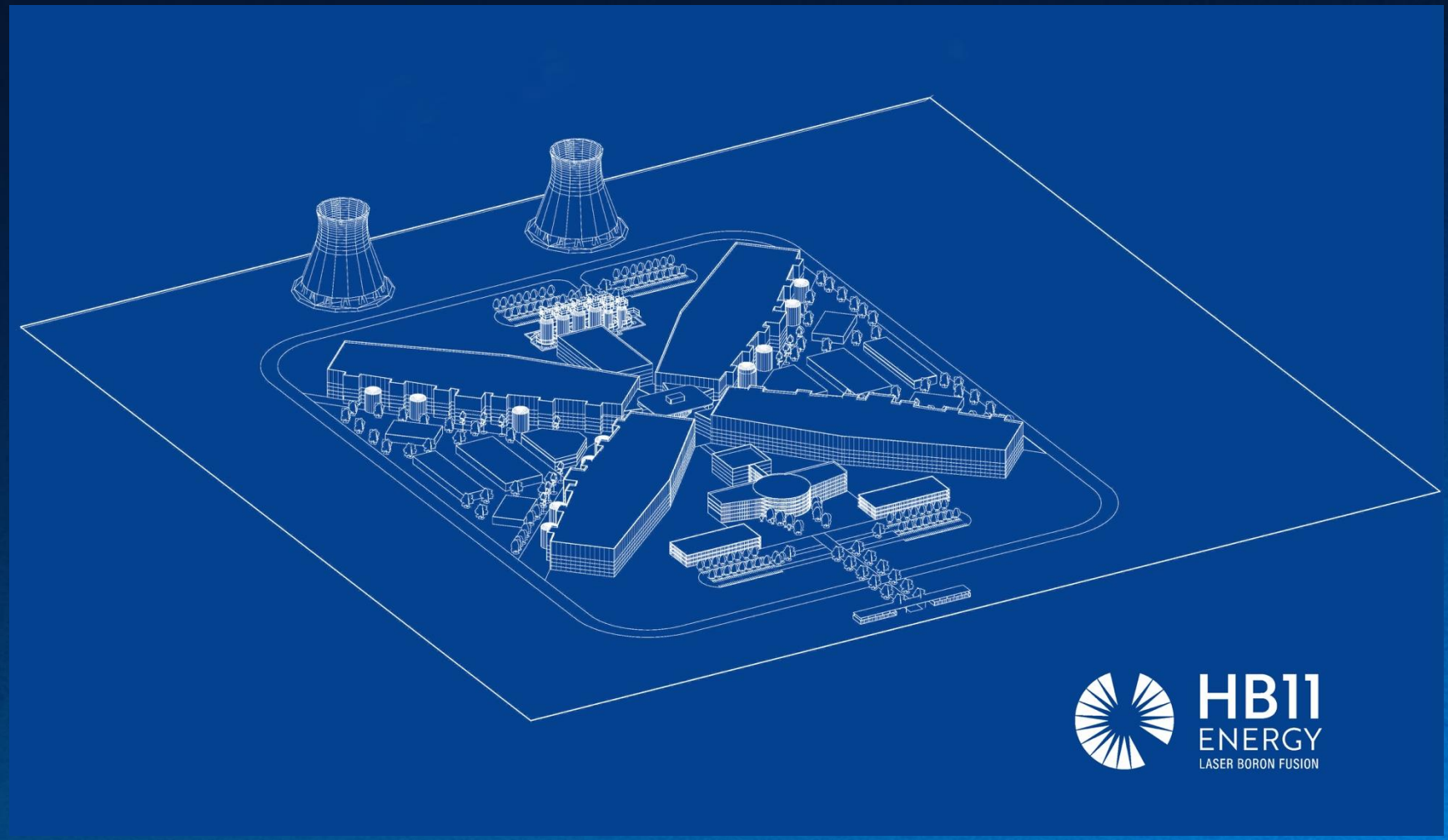
HB11 ENERGY

CLEAN ENERGY FROM LASER FUSION

HB11 ENERGY

HB11 ENERGY

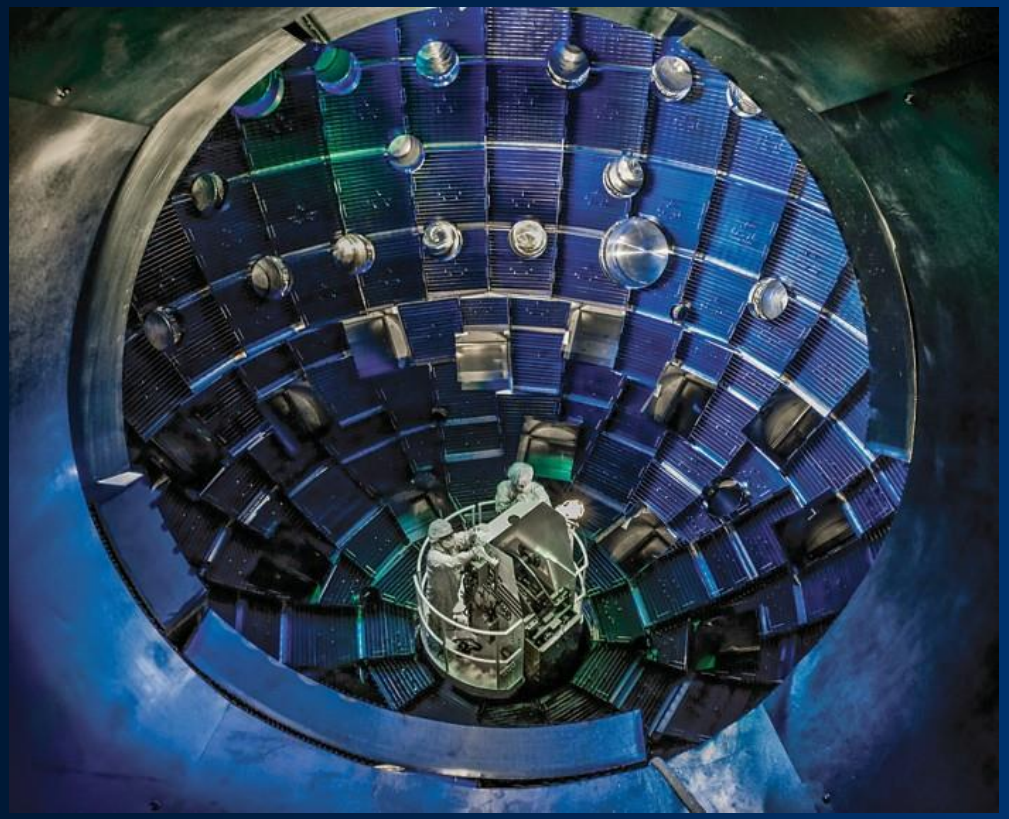
CLEAN ENERGY FROM LASER FUSION

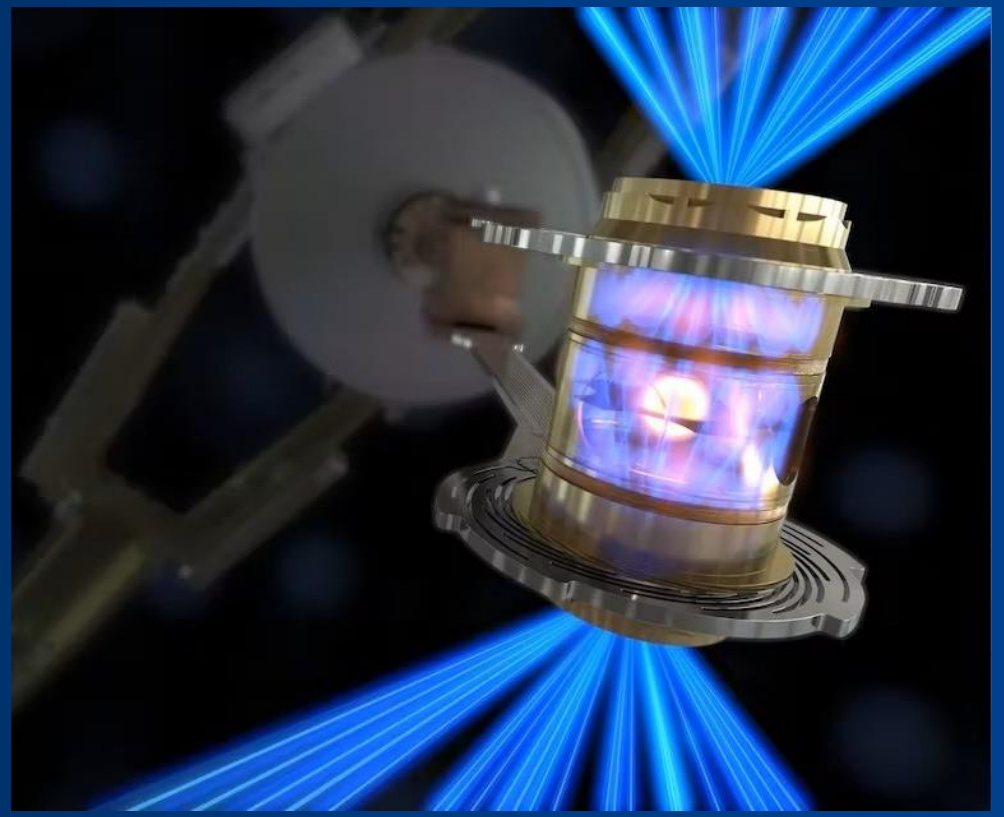


HB11 laser fusion power plant concept. Outline is 1 square km.

BUT ISN'T FUSION ALWAYS 30 YEARS AWAY?

This changed when the National Ignition facility ignited!





THE RACE TO COMMERCIAL FUSION ENERGY

Commercial fusion Energy means electricity for ***<$100/MWh:***

Technical challenges
for laser driven inertial fusion energy:

- **Net-energy-gain > 100**
- **Laser energy efficiency > 10%**
- **Laser energy >10 MJ / pulse**
- **Fuel fabrication < $1 / target**
- **Tritium production and fuel cycle**
- **Materials resilient to extreme conditions**
- **Energy extraction technology**

Financial challenges:

- **Patient Capital – PPP programs / adjacent markets**

**These challenges will require global co-ordination,
through the International Atomic Energy Agency (IAEA) or US DoE Office of Fusion
via milestone-based public-private partnerships (PPP) programs**

THE RACE TO COMMERCIAL FUSION ENERGY

IAEA's World Fusion Outlook 2025,

- 160 fusion devices, >A$15 billion private investment globally

IAEA Director General Rafael Mariano Grossi fusion energy is,

"rapidly becoming a cornerstone of national energy strategies and industrial planning"

AUSTRALIAN OPPORTUNITY

High power lasers will represent most CapEx of a laser fusion power plant.

Australia can leverage its $6B p.a. photonics industry to claim its share of the global supply chain for laser fusion.

Matt Bungey

Director

Type One Energy Australia

THE UNIVERSITY OF MELBOURNE

TYPE ONE ENERGY

Fusion Energy Briefing

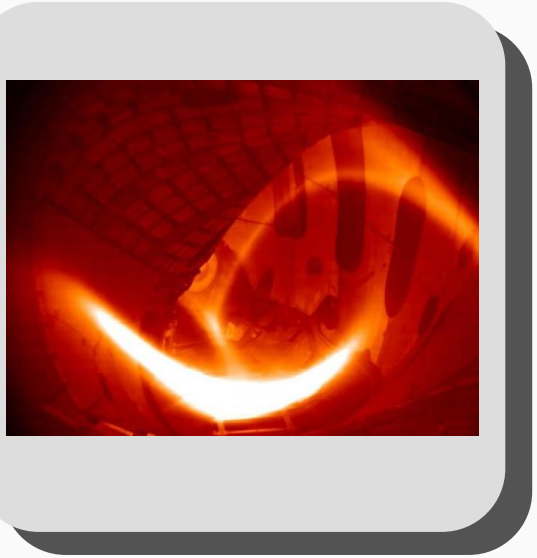
Melbourne Energy Institute

April 2026

Company confidential & proprietary information

FUSION ADVANTAGES

Fusion is a safe, clean energy source that can sustainably power the earth for millions of years.



1 Virtually limitless & safe fuel supply	2 Zero carbon emissions or air pollution
3 No long-term radioactive waste	4 Consistent baseload power
5 Streamlined regulatory pathway	6 Lower cost energy

WHY NOW?

Fusion, the power of the stars, has long been considered the ultimate source of energy.

The future of energy is here, just in time.

The global energy market is experiencing a convergence of unprecedented growth in demand and performance.

AI GRID STRAIN

21% of global energy demand could come from data centers by 2030, up from 1-2% currently.

CLIMATE URGENCY

Fusion produces zero greenhouse gas emissions and minimal relative byproduct.

NEED FOR RESILIENCE

Energy systems are under strain from intermittent renewables and energy security threats.

The world has been pursuing fusion energy for more than 60 years, but new technologies have finally opened the path to commercial reality.

PRACTICAL FUSION

For the first time, advanced fusion machine design has demonstrated the stable, steady-state operations needed for energy production.

SUPERCOMPUTING

Exascale computing enables exponentially faster and more efficient modeling and simulations of complex fusion processes — up to 100,000X more powerful than a few decades ago.

SUPERCONDUCTING

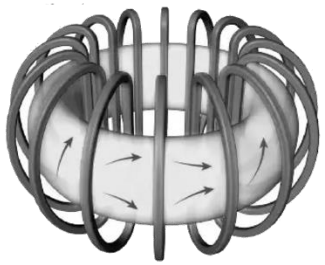
High Temperature Superconducting (HTS) materials enable powerful magnets to hold fusion plasma in economically compact power plant configurations.

TYPE ONE TECHNOLOGY CHOICE

Stellarator technology is a version of the tokamak that, today, uniquely demonstrates stable, continuous operation.

Stellarator research builds on ***50 years and $50B of Tokamak R&D***, with the vast majority being relevant for stellarators.

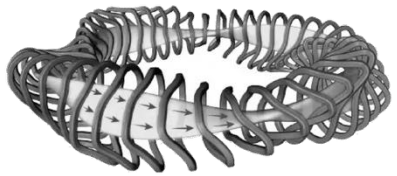
The stellarator design precisely twists the donut-shaped tokamak shape to eliminate the source of disruptive plasma instabilities, enabling steady-state machine operation, reducing first wall material degradation rates, and dramatically lowering parasitic recirculating power needs.



TOKAMAK

Symmetric magnetic confinement fusion machine

- Early adoption as a science device due to simple geometry more easily designed and manufactured in the 1970s
- Pulsed operations and high recirculating loads have made power plant development a challenge
- Rapid degradation of tokamak walls by direct heating from fusion plasma results in impractical operating periods
- No demonstrated solution to inherently unstable operation



STELLARATOR

Twisted tokamak

- Traditionally difficult to optimize, until the recent advent of exascale computing
- Non-planar stellarator magnets do not have cyclic fatigue issues facing planar tokamak magnets, but the shape requires advanced manufacturing techniques to manage costs
- Inherent stability supports continuous operations, providing the high availability required for power plant operations
- Lower neutron wall loading allows longer time between maintenance outages, further supporting a high fusion power plant Capacity Factor

TEAM

Experienced senior management team with strong history of leadership in fusion technology development and scaling technology and energy businesses in prior roles.

BUSINESS LEADERSHIP

Christofer Miguel Mowry
CHIEF EXECUTIVE OFFICER

Charlie Baynes-Reid
CHIEF FINANCIAL OFFICER

Ryan Guerrero
CHIEF OPERATING OFFICER

Anthony Harbridge
CHIEF COMMERCIAL OFFICER

Kairus Tarapore
CHIEF ADMINISTRATIVE OFFICER

Matt Miles
SENIOR VP, EXTERNAL AFFAIRS AND MARKETING

TECHNICAL LEADERSHIP

John Canik
CHIEF SCIENCE OFFICER

ORNL FUSION DIVISION (2007-PRESENT)
HSX (2001-2007)

Thomas Sunn Pedersen
CHIEF TECHNOLOGY OFFICER

DIRECTOR - W7-X (2011-PRESENT)

BOARD OF DIRECTORS

William Madia
BOARD CHAIR

Dan Button
BOARD MEMBER

Phil Larochelle
BOARD MEMBER

Neil Subin
BOARD MEMBER

EXISTING INVESTORS

TVA DEPLOYMENT PARTNERSHIP

Type One Energy is partnering with its first customer, TVA, to support their goal of building and operating the world's first grid-scale commercial fusion plant at Bull Run.

Infinity One *Testing & Training Facility*

Power Plant Design Verification

Confirms critical Infinity Two design margins for:

- Performance of HTS magnet system
- Confinement of plasma heat
- Efficiency of plasma ash exhaust system
- Impact of tungsten wall on plasma core

Power Plant Operational Support

- Showcases 24/7 operations (world's first) beginning in 2029
- Demonstrates maintainability of modular stellarator configuration
- Generates revenue for Type One Energy as a workforce training & research facility

Infinity Two *400 MWe Fusion Power Plant*

Grid Scale	400 MW_e
Affordable	$2,600/kW ONC(1) (NOAK)
Competitive	$39-$50/MWh LCOE(1) (NOAK)
Available	90%+ Capacity Factor
Safe	Class C waste or less
Construction	2028 Start / 2034 COD

Key Deployment Relationships Secured

Customer: TVA Tennessee Valley Authority

Partners: AECOM, Westinghouse

Infinity **ONE** — *Prototype and Testing Training Facility*

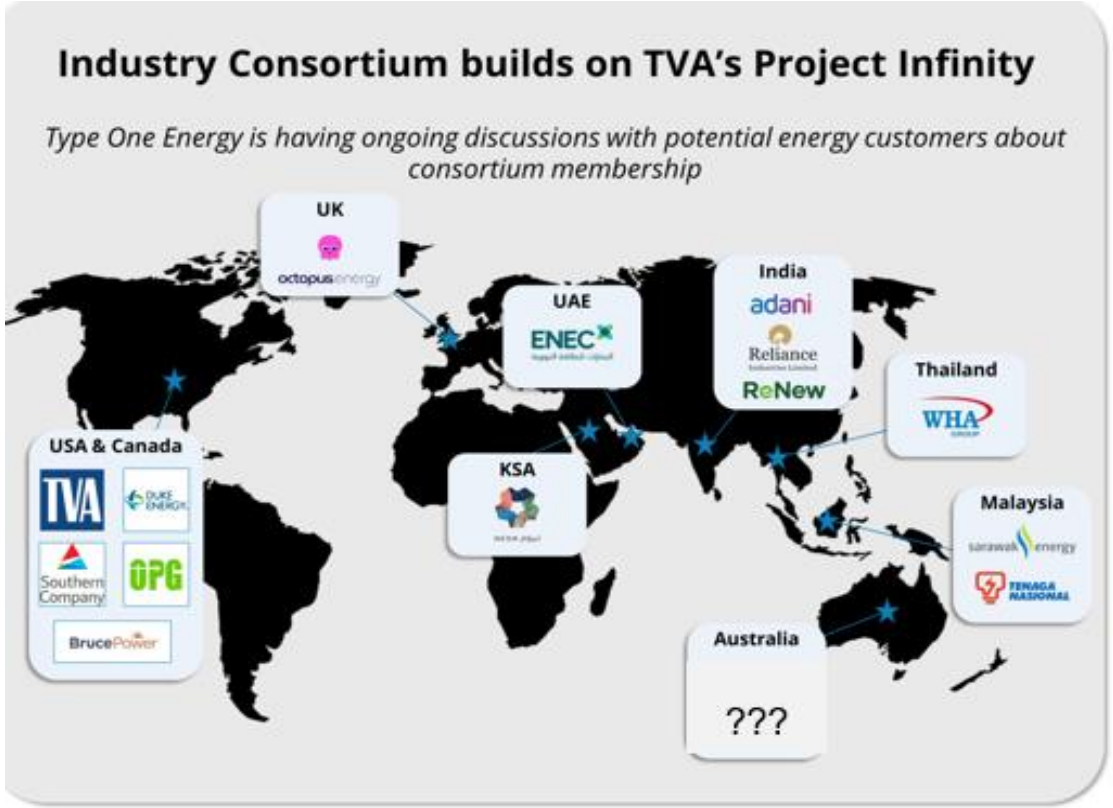
Infinity **TWO** — *TVA's first fusion power plant using Type One Energy's technology*

($10M in site preparation work already spent by TVA)

(1) Nth of a Kind (NOAK) construction and costs are based on an AACE Class 5 overnight cost study for an Infinity Two 500MWe fusion power plant, with an expected accuracy range (i.e., 80% confidence interval) having a low range of -20% to -50% and high range of +30% to +100%. Type One Energy is currently developing a Class 4 study.

GLOBAL MARKET ADOPTION

Type One Energy is partnering with TVA, to build a global consortium of utilities who will oversee the permitting, construction and operation of Infinity One



Benefit of Joining Consortium

- Knowledge share with other prospective Type One Energy fusion power plant owners and off-takers
- Gain exposure to fusion power plant Operations & Maintenance (O&M) through hands-on experience with the Infinity One stellarator Training Facility
- Contribute to global fusion regulation development and licensing processes
- Explore the opportunity to repurpose existing fossil power plant infrastructure for use in generating fusion energy
- Participate in the first Infinity Two project development with TVA as the lead owner/operator
- Engage in the Infinity Two fusion power plant design process, providing input on specifications, features and functions
- Connect with other Industry Consortium members and partnerships to facilitate learning and capital deployment

The Infinity Fusion Consortium was founded and is sponsored by Type One Energy and TVA to globally disseminate the learnings from the design, construction and operation of Infinity One

REGULATORY FRAMEWORK

Lessons from USA and UK

- Regulated under different regulatory regime than Nuclear Reactors
- Tend to be regulated along a materials and accelerator route (e.g. similar to ANSTO synchrotron). This is the route followed by both the UK and US
- US monitors materials and licensing at both federal and state levels
- In general, a lower regulatory threshold required vs nuclear fission, albeit still substantive compliance regime

Fusion Energy Regulatory Principles

Risk-proportionate regulation: Fusion frameworks should reflect **lower radiological hazard vs fission**, focusing on tritium handling and activated materials rather than large-scale meltdown risk.

Leverage existing regimes: Use and adapt **current radiation protection, radioactive materials, and industrial safety frameworks** instead of creating entirely new nuclear regimes.

Technology-neutral, flexible design: Regulatory approaches should be **technology-inclusive** (tokamak, stellarator, inertial, etc.) and adaptable as designs evolve.

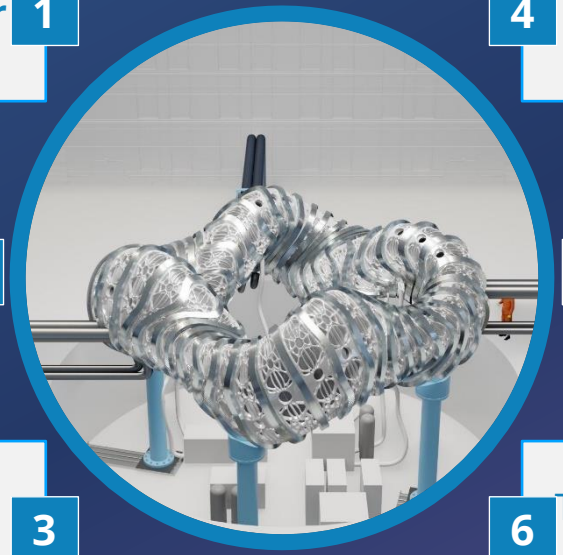
Lifecycle coverage: Regulation should address **full lifecycle risks** – construction, operation, waste management, decommissioning, and environmental impact.

International harmonisation & guidance (IAEA): Promote **common principles, safety standards, and information sharing** to reduce fragmentation and support global deployment. UK and US have led the charge with Canada moving quickly ahead.

PUBLIC RELATIONS

Steps to Building Public Trust in Fusion Energy

1. Education of Policy Makers, Regulators and Market Participants **[Differentiate from Nuclear Fission]**
2. Clearly outline the value proposition of fusion energy within the Australian ecosystem **[Value of Baseload Energy, Supply Chain Opportunity]**
3. Ongoing communications with stakeholders around industry regulatory framework **[UK and US Regulations in place]**



4. Find fast followers in Australian market who may wish to follow TVA and other early adopters **[Project Developers]**
5. Engage with local communities in education **[Tennessee has seen a series of community meetings which have led to strong, sustained support]**
6. Training via University and Academic partnerships **[Build a talent pipeline]**

Our experience in Tennessee has indicated that the prospect of fusion arriving in the mid-2030s has stoked huge support amongst all stakeholders

AUSTRALIAN OPPORTUNITIES

Australia can benefit greatly by taking an early regional leadership position

DEPLOYMENT

- Repurposing old coal facilities to ensure local communities are supported through energy transition
- Supporting renewable build-out with provision of clean baseload and renewable power
- Enable sovereignty of energy supply chain

LOCAL MANUFACTURING

- Enables Australia to remain at the forefront of AI industry by supporting data center buildout
- Facilitate growth of new electricity intensive industries such as Green Steel
- Limit geopolitical supply chain risks for industry

SUPPLY CHAIN

- Huge new supply chains across magnets, lasers, plasma heating, fuel cycle systems and advanced manufacturing are required for the scaling of fusion energy
- Australia's position as gateway to ASEAN region could lead to huge industry opportunities

TALENT

- Australia's world class tertiary education system has an opportunity to supply talent to a new +$1 trillion industry
- Existing leadership positions in advanced manufacturing, material science, energy systems

Dr Sam Sicilia

Chief Investment Officer

Hostplus

THE UNIVERSITY OF MELBOURNE

A CAPITAL ALLOCATOR'S PERSPECTIVE

Investing in Fusion Energy

Capital, Policy and the Path to an Australian Fusion Industry

Dr Sam SICILIA
Chief Investment Officer, Hostplus
Future Energy Forum · 23 April 2026

HOSTPLUS ATTRIBUTES

What matters for superfund long-time-horizon investing

Not all allocators of capital are created equal

Scale & Cashflow

Hostplus is a $150 B accumulation fund

Strong positive cash inflows
- Annual Member Contributions ~$16B.
- Annual Investment Earnings (@5%) ~$7.5B (@10%) ~$15B

Young Demographics

Two million members

Average Age ~39

Investment Beliefs

Believe in active investment management
Invest in unlisted assets (such as Private Equity & Venture Capital)
Capture illiquidity premium (first invested in fusion (CFS) in 2017)

We understand our role as a (long-term) patient allocator of capital
We understand that diversification is the best way to mitigate risk

Supportive Board

Venture Capital is at the risky end of investing in Private Markets

Critically - Hostplus Board understands the risk-return trade-off

MOTIVATION

Why a long-time-horizon allocator takes fusion seriously

Drivers that align fusion with a superannuation investment mandate

Investment horizon

A super fund invests for its members across 30 to 50-year horizons

Fusion's commercialisation timeline matches (not contradicts) that mandate

Transition exposure

Renewables (wind/solar) plus firming (dispatchable power such as batteries or pumped hydro) can remain the core allocation

But fusion is the only plausible answer to large-scale, dispatchable, zero-carbon, baseload energy at civilisational scale

Asymmetric option value

Venture-stage capital is modest in absolute terms

But the payoff profile (if a single credible pathway reaches commercial ignition) is category-defining

Member outcomes and sovereignty

Abundant low-cost clean energy underpins real returns across every other asset class

Australia cannot afford to be a pure price-taker on the next energy platform

INVEST IN UNPROVEN TECHNOLOGIES

Science fiction IS NOT investible - but science IS investible (and engineering matters)

Practical energy-system relevance:

1. Next-gen batteries
2. Super geothermal
3. Fusion energy
4. Space solar power
5. Atmospheric electricity
6. Antimatter energy

not invested (yet)

Commonwealth Fusion Systems (CFS)

First Light Fusion (FLF)

Quaise Energy

Zanskar

BESS

AUSTRALIA

The local journey: real strengths, structural barriers

We must ensure fusion energy is part of our future economy

What we have

- World-class plasma and laser physics at ANU, UNSW, Sydney, Adelaide
- HB11 Energy (Sydney-based, globally competitive laser proton-boron company)
- CSIRO (superconducting magnet and materials capability)
- Established diaspora (in ITER, JET, CFS, TAE)

What holds us back

- No dedicated national fusion program or coordinated funding line
- Regulatory ambiguity (fusion caught within nuclear prohibition framing)
- Brain drain to jurisdictions with clearer frameworks
- Absence of demonstration-scale host infrastructure
- Domestic patient capital has not yet stepped in at scale

What is needed

- National fusion strategy with ring-fenced multi-year funding
- Legislative clarity separating fusion from fission
- Demonstration facility open to foreign and domestic technology
- Co-investment vehicle to crowd in institutional capital
- Tax treatment appropriate for deep-tech timelines

REGULATION

Regulatory frameworks are diverging (quickly)

Jurisdictions that distinguish fusion from fission are attracting capital

Jurisdiction	Posture	Framework
United Kingdom	Leader	Fusion legally distinguished from fission. Regulated by HSE and Environment Agency as a specialised industrial facility. STEP demonstration plant being developed at West Burton.
United States	Pragmatic	NRC has formally adopted a risk-informed, Part 30 byproduct-materials style framework for fusion which is distinct from fission licensing. Clear signal to private capital.
Japan & Canada	Emerging	Both developing light-touch, technology-appropriate frameworks. Japan hosting significant magnetic confinement work; Canada active in tritium supply chain.
European Union	Evolving	EUROfusion coordinates research. Regulatory review underway which is broadly expected to follow UK direction rather than fission-heavy precedent.
Australia	Blocked	Fusion is implicitly caught by ARPANS Act and EPBC Act prohibitions on nuclear installations. Research unrestricted; commercial deployment currently not possible without legislative change.

DEPLOYMENT

How fusion integrates into Australia's energy system

First commercial plants arrive in the 2035 to 2040 window - aligned with the coal retirement curve

Co-locate with industrial load

Hydrogen, ammonia, aluminium, data centres (loads that reward firm baseload and can absorb long-duration offtake)

Firm, not replace, renewables

Complement the renewable core with dispatchable zero-carbon capacity rather than competing with it

Reuse coal-plant sites

Existing transmission, cooling water access, trained workforce, community familiarity with large-scale generation

Couple to export ambitions

Green hydrogen and ammonia export require continuous power. Fusion's duty cycle matches that better than intermittent sources

CAPITAL

Financing fusion: directing capital domestically

Different stages need different capital but the sequence matters

Pre-commercial

Venture · 2026–2032

Global VC with selective super fund co-investment.

Risk profile suits growth allocations.

Domestic share builds optionality and talent retention.

First-of-a-kind

Demonstration · 2030–2038

Government de-risking essential.

ARENA, CEFC and Future Made in Australia vehicles crowd in institutional capital.

Blended finance is the unlock.

Nth-of-a-kind

Project finance · 2038+

Institutional scale. Super funds, infrastructure funds & sovereign allocators.

Long-dated, inflation-linked, credit-enhanced.

This is the big pool.

Directing capital to domestic fusion activity:

Co-investment vehicle (CEFC-led) alongside super fund capital · Local content conditions tied to concessional finance · Fusion-eligible R&D tax incentives · Fit-for-purpose sovereign fusion fund

PEOPLE

The workforce and the role of universities

Without the people, the capital has nowhere to go

The human capital challenge

~10,000

specialists needed for a mature Australian fusion industry

<100

relevant graduates produced domestically each year

200+

Australian fusion researchers working abroad
(represents a repatriation opportunity)

What universities uniquely provide

- **Fundamental research retention**
  Plasma physics, materials, superconducting magnets, tritium handling (capabilities that typically take decades to build).
- **Industry-partnered centres**
  A dedicated ARC Centre of Excellence or CRC for fusion (the structural vehicle that converts research into industry capability).
- **Workforce pipeline**
  Fusion electives embedded in engineering and physics degrees. Industry-matched PhD programs with cost-sharing from private and public capital.
- **Global connectivity**
  Partnerships with ITER, MAST-U, CFS, TAE.
  (Repatriation pathways for Australian researchers currently based abroad).
- **Trusted public voice**
  Independent scientific communication on fusion (credible with community in a way industry and government cannot be).

THE PATH FORWARD

A coherent Australian fusion agenda

Five commitments that, together, unlock the category.

1. **Regulation** Legislative clarity distinguishing fusion from fission
2. **Capital** A blended (PPP) co-investment vehicle that crowds in institutional capital at first-of-a-kind
3. **Workforce** A dedicated fusion CRC or ARC Centre of Excellence, matched to an immigration pathway
4. **Demonstration** A host facility that lets foreign and domestic technology operate and be learned from in Australia
5. **Social Licence** Structured, early engagement with host communities (the message really matters!)

The cost of inaction: Australia becomes a technology importer with IP, supply chain and member savings all flow offshore.

Professor Maria Rost Rublee

Professor, International Relations

University of Melbourne

THE UNIVERSITY OF MELBOURNE

Social Licence and Nuclear Fusion

PROFESSOR
MARIA ROST RUBLEE

UNIVERSITY OF
MELBOURNE

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The Concept of Social Licence

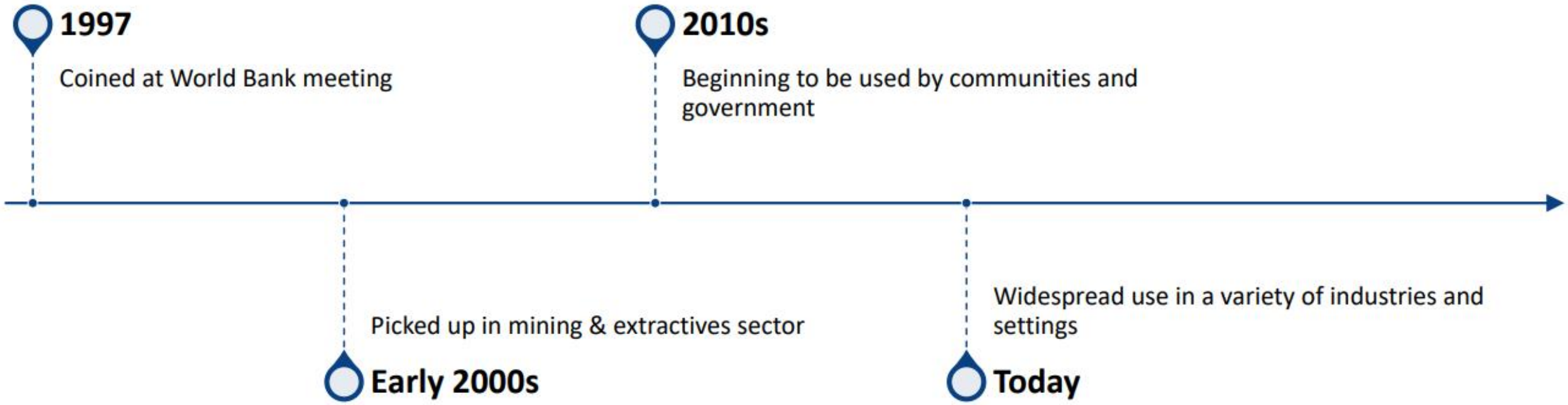


Image Credit: University of Melbourne Energy Institute

Social Licence as a Type of Licence

"A mining company may be properly registered with all appropriate agencies; it may have a mining license, it may be listed with ASIC and be paying its taxes. It may meet every single obligation under the Fair Work Act. But if the mine is using up precious natural resources without taking due care of the environment or local residents, it will have failed to gain the trust and confidence of the community in which it operates" (Ethics Centre 2018)

Social Licence Definition

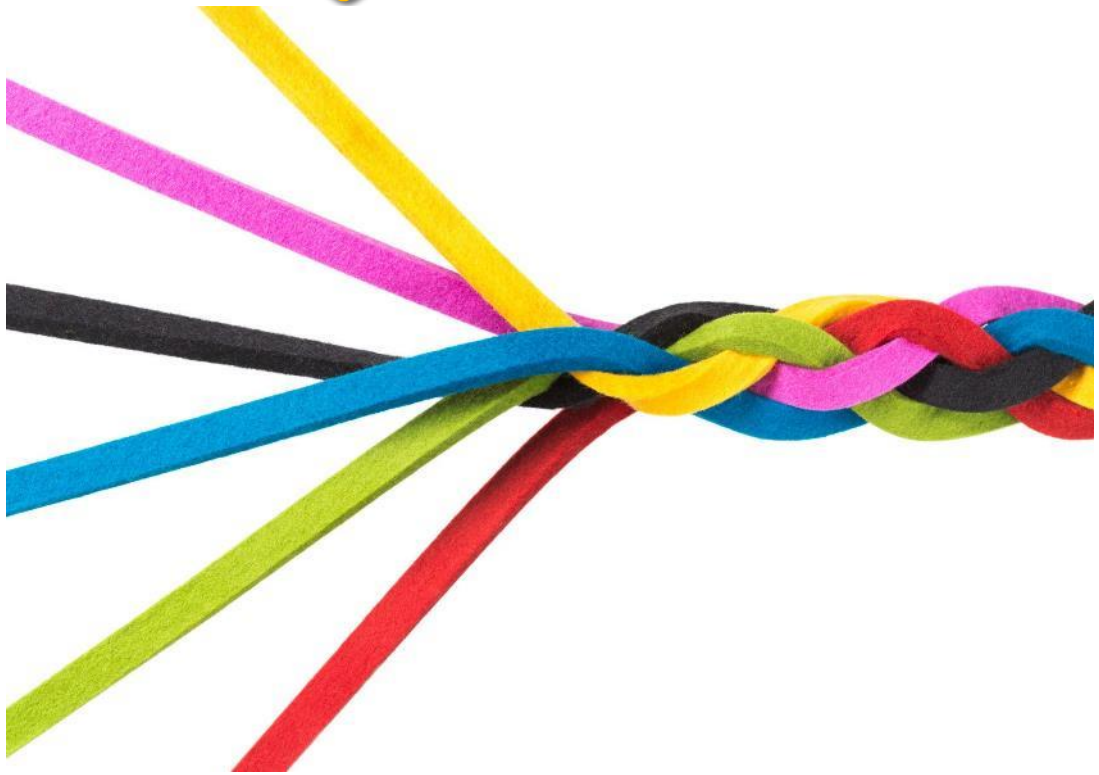
Ongoing popular and political support for, and confidence in, the technical, political and economic plans for the technology or policy in question (Rublee 2023)

This Photo by Unknown Author is licensed under CC BY-ND

Social Licence: What It Is & *Is Not*

- It shouldn't be a tick-box exercise
- It's not an education campaign designed to inform an emotional or irrational public
- It should be an honest discussion and partnership with community members, as equals
- In a democracy, community members have the right and obligation to determine what constitutes an acceptable risk

What contributes to social licence?



Research indicates numerous factors contribute toward social licence:

- Trust towards the company/industry
- Quantity of contact with the company/industry
- Quality of contact with the company/industry
- Perceived procedural fairness
- Impacts on social infrastructure

These factors are shaped not just by present-day perceptions, but over time and space. They need to generated for project approval, but also ongoing operation.

Social Licence & Nuclear Technology

Because nuclear technology (normally) generates radioactive waste – which can last hundreds of thousands of years – the bar for social licence needs to be higher

Treating social licence as a performative measure results in DADA

Most nuclear siting projects fail not because of technical issues, but because of social licence issues

Social licence & fusion technology

While nuclear fusion is *nuclear*, the lack of radioactive byproducts means the long-time scale of wastes could reduce social licence concerns

However, this doesn't mean a social licence "free ride" – public concerns need to be heard and genuinely responded to, rather than dismissed. The weight of "nuclear" – especially in Australia – is real.

Incorporating social licence from the start, with real investment in engaging with communities – rather than "education campaigns" – will significantly improve trust and positive outcomes

Future Energy Forum

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HB11 Energy

Mr Matt Bungey
Type One Energy

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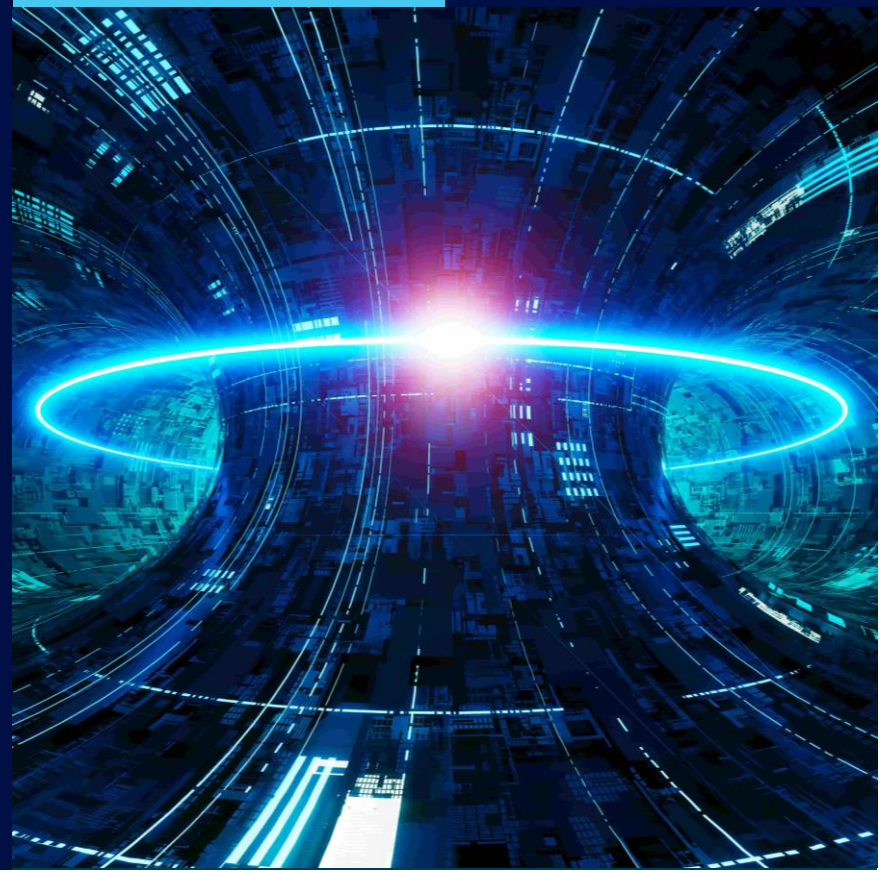

Thank you

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